UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,646	03/03/2005	Hideki Nakata	10873.1648USWO	5806

53148 7590 05/31/2006

HAMRE, SCHUMANN, MUELLER & LARSON P.C.
P.O. BOX 2902-0902
MINNEAPOLIS, MN 55402

EXAMINER	
RIVERO, MINERVA	
ART UNIT	**PAPER NUMBER**
2627	

DATE MAILED: 05/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/526,646	NAKATA ET AL.	
	Examiner	Art Unit	
	Minerva Rivero	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

The term "substantial" in claims 1-29 is a relative term which renders the claims indefinite. The term "substantial" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The Examiner has interpreted the term at her discretion and treated the claims on the merits.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-18, 21-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda *et al.* (US 6,320,699), hereinafter Maeda, in view of Komma *et al.* (US 6,192,020), hereinafter Komma.

5. Regarding claims 1, 2, 10, 14, 15, 18 and 22, Maeda discloses an optical head comprising:

a semiconductor laser (Col. 5, Line 54);

an objective lens drive for driving the objective lens (Col. 5, Lines 45-46);

an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium (Col. 5, Lines 45-50);

a collimator lens located between the semiconductor laser and the objective lens (Col. 5, Line 55);

a light beam reflection portion that reflects the light beam from the semiconductor laser and moves together with the objective lens (*light is reflected by beam splitter*, Col.

6, Lines 30-37, see Fig. 1, element 3, *note alignment of beam splitter 3 with objective lens 4*; *correcting plates*, Col. 6, Line 32);

a voltage controller for applying a voltage to the objective lens drive so that the objective lens is driven in a focusing direction (*circuit to drive objective lens*, Col. 5, Lines 50-52);

a light-receiving element that receives the light beam that is reflected by the information recording medium and separated by the light beam separator, and converts the light beam to an electrical signal (*photodetector*, Col. 6, Lines 44-48); and

an arithmetic circuit that corrects a value of the electrical signal detected by the light-receiving element in accordance with a radial position signal corresponding to an amount of shift of the objective lens in the radial direction of the information recording medium, and detects the relative angle between the information recording medium and the objective lens or an amount of tilt of the information recording medium with respect to a predetermined reference plane (*driving an objective lens in the radial and focusing direction of the optical disc in order to converge a laser beam toward the information medium*, Col. 5, lines 45-52; *electric signals supplied to a driving circuit forwarded to the objective lens*, Col. 6, Lines 48-54).

However, Maeda does not explicitly disclose but Komma does disclose a light beam separator that is located between the semiconductor laser and the objective lens, includes substantial interference regions for light that is reflected from the information recording medium and travels in a straight path and ± first-order diffracted light produced by information tracks of the information recording medium, and

diffracts each of plural light beams in regions of the substantial interference regions, where an amount of light is changed by a change in a relative angle between the information recording medium and the objective lens and by a shift of the objective lens in a radial direction of the information recording medium, and a light beam separator diffracts part of each of the light beams in the substantial interference regions (Col. 7, Lines 34-37, see light beam separator 175 between light source 2 and objective lens 4 in Fig. 1; *diffracted beams result in lowered intensity of light beam returning to the light source*, Col. 8, Lines 2-4).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to have a light beam separator that is located between the semiconductor laser and the objective lens, includes substantial interference regions for light that is reflected from the information recording medium and travels in a straight path and ± first-order diffracted light produced by information tracks of the information recording medium, and diffracts each of plural light beams in regions of the substantial interference regions, where an amount of light is changed by a change in a relative angle between the information recording medium and the objective lens and by a shift of the objective lens in a radial direction of the information recording medium, as disclosed by Komma, in order to avoid generation of noise caused by returning light beam, as further disclosed by Komma (Col. 8, Lines 4-6).

6. Regarding claim 3, Maeda does not explicitly disclose but Komma does disclose the plural light beams are present in four regions of the light beam separator, the four

regions are separated from each other by an axis in the radial direction and an axis in the tangential direction, and the two axes pass through a substantial center of the light that is reflected from the information recording medium and travels in a straight path (Col. 4, lines 56-66).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to modify the teachings of Maeda, and have the plural light beams present in four regions of the light beam separator, the four regions being separated from each other by an axis in the radial direction and an axis in the tangential direction, and the two axes passing through a substantial center of the light that is reflected from the information recording medium and travels in a straight path, as disclosed by Komma, in order to obtain a tracking error by processing the four photocurrents, as further disclosed by Komma (Col. 4, Line 66 – Col. 5, Line 2).

7. Regarding claim 4, Maeda discloses an objective lens drive for driving the objective lens in the radial direction and a focusing direction (Col. 5, lines 45-52; *electric signals supplied to a driving circuit forwarded to the objective lens*, Col. 6, Lines 48-54), wherein the radial position signal is calculated by using an applied current to drive the objective lens in the radial direction (*electric signals supplied to a driving circuit forwarded to the objective lens*, Col. 6, Lines 48-54).

8. Regarding claim 5, Maeda discloses the radial position signal is produced by calculating amounts of light in at least two regions of the light beam separator, and the

at least two regions are outside the substantial interference regions and are separated from each other by an axis in a tangential direction passing through a substantial center of the light that is reflected from the information recording medium and travels in a straight path (*generating a focusing error and a tracking error on the basis of the electric signals supplied from the photodetector*, Col. 6, Lines 44-54).

9. Regarding claim 6, Maeda does not explicitly disclose but Komma does disclose the light beam separator is a hologram or a diffraction grating made of resin or glass (*holographic element made of glass*, Col. 31, Lines 13-15).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Maeda with having the light beam separator be a hologram or a diffraction grating made of resin or glass, as disclosed by Komma, since duplicates can be mass-produced at a sufficiently low cost, as further disclosed by Komma.

10. Regarding claim 7, Maeda discloses the light beam separator comprises a λ/4 plate and a polarizing hologram that is located between the λ/4 plate and the semiconductor laser and has a diffraction effect only for a light beam of a predetermined polarization component, and the light-receiving element receives the light beam diffracted by the polarizing hologram (*polarizing beam splitter and λ/4 plate*, Col. 5, Lines 53-57).

11. Regarding claim 8, Maeda discloses the light beam separator is integrated with the objective lens and moved together with the objective lens in a focusing direction and the radial direction (Col. 5, Lines 41-52, see Fig. 1, element 3, *note alignment of beam splitter 3 with objective lens 4*).

12. Regarding claim 9, Maeda discloses a collimator lens between the objective lens and the semiconductor laser, wherein the collimator lens is integrated with the light beam separator (Col. 5, Lines 53-56, see Fig. 1, elements 2 (collimator lens) and 3 (polarizing beam splitter)[See Applicant's Specification, Fig. 1, elements 35 (collimator lens) and 50, (diffraction grating).]).

13. Regarding claim 11, Maeda discloses the light beam reflection portion is formed in an objective lens holder for holding the objective lens (Col. 3, Lines 11-14).

14. Regarding claim 12, Maeda discloses an objective lens drive for adjusting the inclination angle of the objective lens and a second light-receiving element for receiving a light beam reflected by the information-recording medium (*photodetector and objective lens driver*, Col. 6, Lines 44-54).

15. Regarding claim 13, Maeda discloses an objective lens drive for driving the objective lens in the radial direction and the focusing direction, wherein the radial

position signal is calculated by using an applied current to drive the objective lens in the radial direction (*objective lens driver*, Col. 6, Lines 44-54).

16. Regarding claim 14, Maeda discloses a light beam separator that is located between the semiconductor laser and the objective lens (Col. 5, lines 45-52; *electric signals supplied to a driving circuit forwarded to the objective lens*, Col. 6, Lines 48-54), wherein the radial position signal is produced by calculating the amounts of light in at least two regions of the light beam separator, and the at least two regions are outside the substantial interference regions for light that is reflected from the information recording medium and travels in a straight path (*electric signals supplied to a driving circuit forwarded to the objective lens*, Col. 6, Lines 48-54).

17. Regarding claim 16, Maeda discloses an objective lens drive for driving the objective lens in the radial direction and the focusing direction, wherein rotational adjustment of the light beam separator with respect to the information recording medium is performed by rotating the objective lens drive around a central axis of the objective lens, and an arrangement of the light spots on the information recording medium is adjusted by the rotational adjustment (*objective lens driving mechanism for driving an objective lens in the radial and focusing directions*, Col. 5, Lines 44-50).

18. Regarding claim 17, Maeda discloses the light beam separator is a hologram or a diffraction grating (Col. 12, Lines 4-8).

19. Regarding claim 21, Maeda discloses the light beam reflection portion is a light reflection film formed by deposition or application (Col. 12, Lines 61-65).

20. Regarding claim 23, Maeda discloses the light beam reflection portion is placed substantially outside an effective light beam diameter of the collimator lens and formed integrally near the exterior of the collimator lens (see polarizing beam splitter 3, collimating lens 2 and correcting plates 101-2 in Fig. 2).

21. Regarding claim 24, Maeda discloses the light beam reflection portion is formed by deposition, application, or coating of an aluminum reflection film or light reflection film near the exterior of the collimator lens (Col. 12, Lines 61-65; see polarizing beam splitter 3, collimating lens 2 and correcting plates 101-2 in Fig. 1).

22. Regarding claim 26, Maeda discloses the reference position is any one selected from a turntable for holding the information recording medium, part of the optical head, and a guide shaft of the optical head (*optical axis, radial and tangential directions*, see Fig. 1).

23. Regarding claim 27, 'the driving signal from the voltage controller is any one selected from a triangular wave, a sine wave and a trapezoidal wave', the Examiner takes Official Notice that the aforementioned waves are well known and commonly used in the art for carrying information.

24. Regarding claim 28, Maeda discloses the arithmetic unit detects relative positions of the information recording medium with respect to the reference position in the focusing direction in at least two different portions of the information recording medium, the relative angle between the information recording medium and the objective lens, the amount of warping and the cross-sectional shape of the information recording medium by using the relative positions (*optical disc thickness*, Col. 3, Lines 30-33; *focusing and tracking error signals are supplied to objective lens driving signal*, Col., Lines 53-54).

25. Regarding claim 29, Maeda discloses at least one selected from the amount of tilt corresponding to the calculated radial position of the information recording medium, the relative angle between the information recording medium and the objective lens, the amount of warping and the cross-sectional shape of the information recording medium is stored in a memory, and a tilt correction signal is generated to change the relative angle between the objection lens and the information recording medium in accordance with radial position by using information of the memory (*optical disc thickness*, Col. 3, Lines 30-33; *focusing and tracking error signals are supplied to objective lens driving signal*, Col., Lines 53-54).

26. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, in view of Komma, and further in view of Takekoshi *et al.* (US 5,602,383), hereinafter Takekoshi.

Regarding claims 19 and 20, Maeda discloses an optical base for holding the semiconductor laser (*main unit*, Col. 5, Lines 42-44 and 53-54), a light beam reflection portion is formed integrally with the optical base (*polarizing beam splitter*, Col. 5, Lines 50-53, see Fig. 2; [See Fig. 15B, elements 19 (optical base) and 60 (reflection portion) of Applicants' Specification.]), a light reflection film is formed on the light beam reflection portion (*polarizing beam splitter*, Col. 5, Lines 50-53; *multilayer films*, Col. 6, Line 35), and the optical base is formed integrally with the light beam reflection portion made of glass (*polarizing beam splitter*, Col. 5, Lines 50-53, see Fig. 2; [See Fig. 15B, elements 19 (optical base) and 60 (reflection portion) of Applicants' Specification.]; *glass refraction surfaces*, Col. 12, Lines 58-65).

However, Maeda does not explicitly disclose but Takekoshi does disclose the optical base is made of metal or resin (Col. 11, Lines 39-40).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Maeda and Komma, and have the optical base for holding the semiconductor laser, wherein the optical base is made of metal or resin, since it allows for mass-production of the optical bases through resin molding.

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Brazas *et al.* (US 5,689,492) disclose an assembly used for precisely positioning the component parts of a laser detector-grating unit.

Kay *et al.* (US 5,544,143) disclose a laser-detector-grating unit.

Brazas, Jr. (US 5,511,059) discloses a multi-element grating beam splitter with a reflection grating element.

Shimano *et al.* (US 5,481,386) disclose an optical head integrally formed with light source and photodetector.

Komma *et al.* (US 2002/0097660) disclose a diffraction grating body and optical pick-up apparatus.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minerva Rivero whose telephone number is (571) 272-7626. The examiner can normally be reached on Monday-Friday 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MR 5/17/06

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER